1. **Confidential requirement: Specimen K – 5 Rastrineobolla argenti (Omena in Luo)**

You are provided with a specimen labelled K. With the help of a hand lens examine the specimen.

a) (i) State the phylum to which the specimen belongs chordata;

(ii) Using the observable features only, name the class to which the specimen belongs.
Pisces.

(iii) Give your answer in (a) (ii) above
Lateral line / operculum / gill cover / gills, fins
Acc. fish, osteichythes / bonny fish etc

b) Using the observable features, only state how the animal is adapted to living in its habitat.
-Streamlined body for easy movement / minimize friction (owwte)
-Presence of fins for swimming / balance
-presence of gills for breathing in water/gaseous
Exchange / operculum / gills cover to allow water of pass out.
-Presence of lateral line helps vibration / movements in water
Waves / disturbance in water.

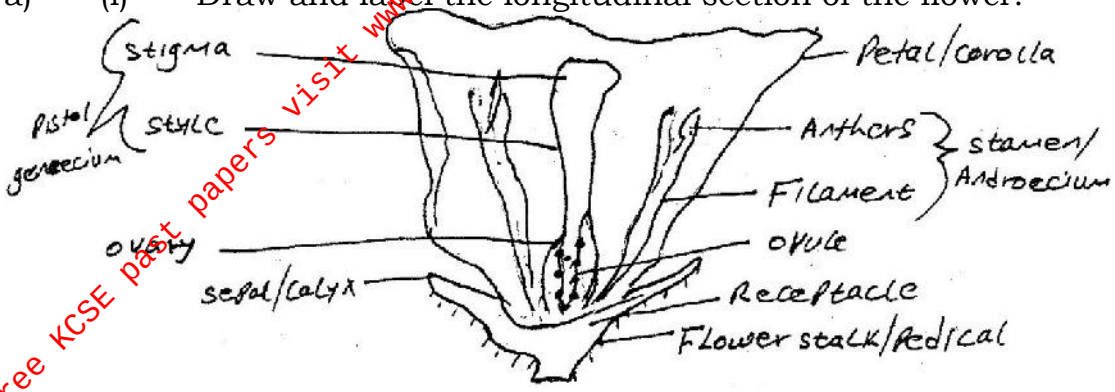
c) Cut three of specimen K into tiny pieces. Place the pieces into a boiling tube. Add 5m if water. Boil for five minutes. Decant the extract into a clean test tube.
Using the reagents provided, identity the food substances in the extract. Record the food substances being tested for observations and conclusions in the table below.

Food substance	procedure	observations	Conclusion
Protein	To the extract add dilute Na0H solution and 1% copper sulphate;	Violet/purple colour appears	Protein present
Reducing sugar	To the extract add Benedict's solution boil / warm	No colour change	Reducing sugar absent.

2. Confidential requirement: Specimen M- Freshly picked and intact mature
Flower obtained Solanum incanum or Lycopersicon.

You are provided with a specimen labeled M. Make a longitudinal section through the flower.

a) (i) Draw and label the longitudinal section of the flower.



(ii) State the magnification of your drawing
X1 – X10 (with or without the x)

b) (i) Name the agent of pollination of the flower
Insects – (Reg – animal alone)

(ii) State two ways, which the flower is adapted for pollination by the agent named in b(i) above.
Brightly coloured to attract insects.
Stigma is below another to avoid self – pollination
Smell/ scent to attract insects.

3. Confidential requirement: Specimen N Freshly killed soldier termite. Specimen p –Freshly killed weevil, Specimen Q – Freshly killed maggot of a housefly.

Animal	**Type of Environment**	**Reason**
N	Moist	Soft skeleton/cuticle/body/outer covering Thin
P	Dry	Hard wings / hard Exoskeleton
Q	Moist	Soft Exoskeleton/body/covering cuticle.

b) With a reason in each case, state the type of locomotion each animal exhibits.

Animal	**Type of locomotion**	**Reason**
N	Walking	Presence of legs
P	Walking	Presence of legs
	Flying	Presence of wings
Q	Crawling / Wriggling	Presence of prolegs / no Legs / pseudo legs (false)

C) (i) Adult / imago;
(ii) Larva Rej; maggot

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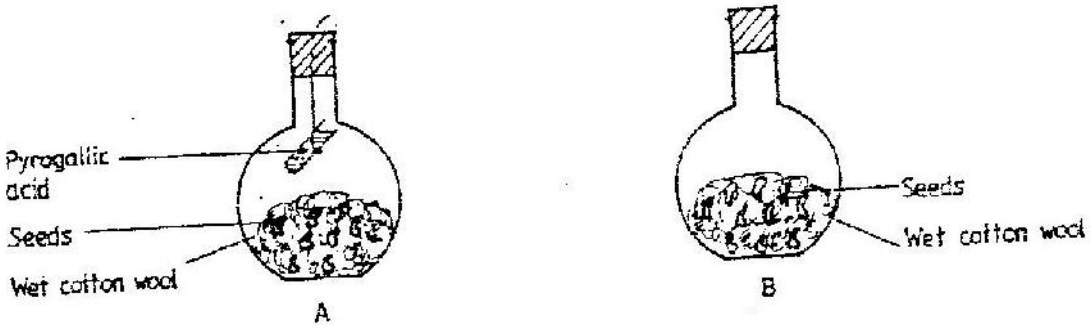
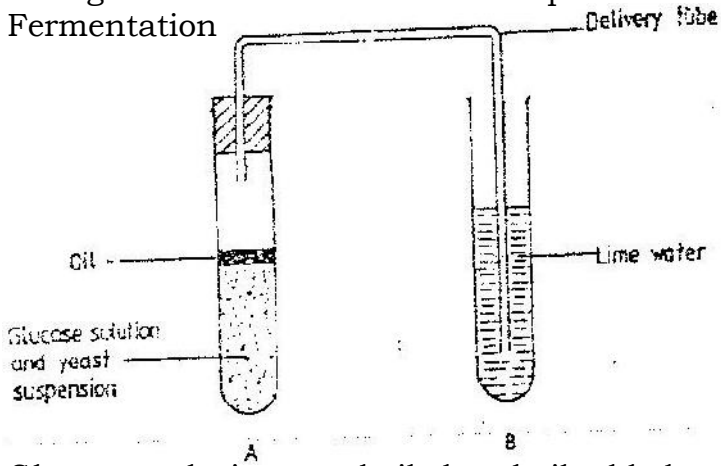
QUESTIONS

1. State the function of Deoxyribonucleic acid (DNA) molecule (1mk)
2. State two ways by which acquired Immune deficiency syndrome (A.I.D.S) Virus is transmitted. (2 mks)
3. When is glycogen which is stored in the liver converted into glucose and released into the blood (1 mk)
4. Name the disease in humans that is caused by lack of vitamin C (1 mk)
5. An organ is with an exoskeleton, segmented body, two pairs of legs per segment, a pair of eyes and a pair short antennae belongs to the phylum (1 mk)
6. What are two organisms considered to belong to the same species (2 mks)
7. (a) state the role of light in the process of photosynthesis (1 mk)
   (b) Name one end product of dark reaction in photosynthesis (1 mk)
8. State two functions of cell sap (2 mks)
9. State three characteristics that ensure cross – pollination takes place in flowering plants (3 mks)
10. A student set up an experiment as shown in the diagrams below



The set up was at room temperature for a week
(a) What was the aim of the experiment? (1 mk)
(b) What would be the expected results at the end of the experiment (2 mks)

11. Give a reason why it is only mutation in genes of gametes that can influence evolution (1 mk)
12. Give a reason why it is necessary for frogs to lay many eggs (1 mk)
13. The diagram below shows a set – up that was used to demonstrate Fermentation



Glucose solution was boiled and oil added on top of it. The glucose solution was then allowed to cool before suspension.

(a) Why was the glucose solution boiled before adding the yeast Suspension? (1 mk)

(b) What was the importance of cooling the glucose solution before adding the yeast suspension? (1 mk)
(c) What was the use of oil in the experiment? (1 mk)
(d) What observation would be made in test tube B at the end of the experiment? (1 mk)
(e) Suggest a control for this experiment (1mk)

14. (a) Describe the path taken by carbon dioxide released from the tissue of an insect to the atmosphere (3 mks)
(b) Name two structures used for gaseous exchange implants (2 mks)

15. To estimate the population size of crabs in a certain lagoon, traps were laid at random. 400 crabs were caught, marked and released back into the lagoon. Four days later, traps were laid again and crabs were caught. Out of the 374 crabs, 80 were found to be marked.
(a) calculate the population size of the crabs in the lagoon using the formula below

$$N = \frac{n \times M}{m}$$

Where N = Total population of crabs in the lagoon
n = Total number of crabs in the second catch
M = Number of marked crabs during the first
m= Number of marked crabs in the second catch (2 mks)
(b) State two assumptions that were made during the investigation (2 mks)
(c) What is the name given to this method of estimating the population size (1 mk)

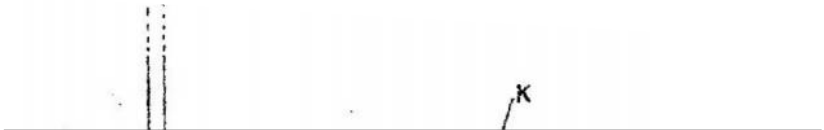
16. A shoot of seedling exposed to light on one side bends towards the source of light as it grows
(a) Name the response exhibited by the shoot of the seedling (1 mk)

(b) Explain how the bending towards the source of light occurs (3 mks)

17. (a) How may excessive bleeding results in death? (4 mks)
(b) Name the process by which the human body naturally stops Bleeding? (1 mk)
(c) How can low blood volume be brought back to normal (3mks)

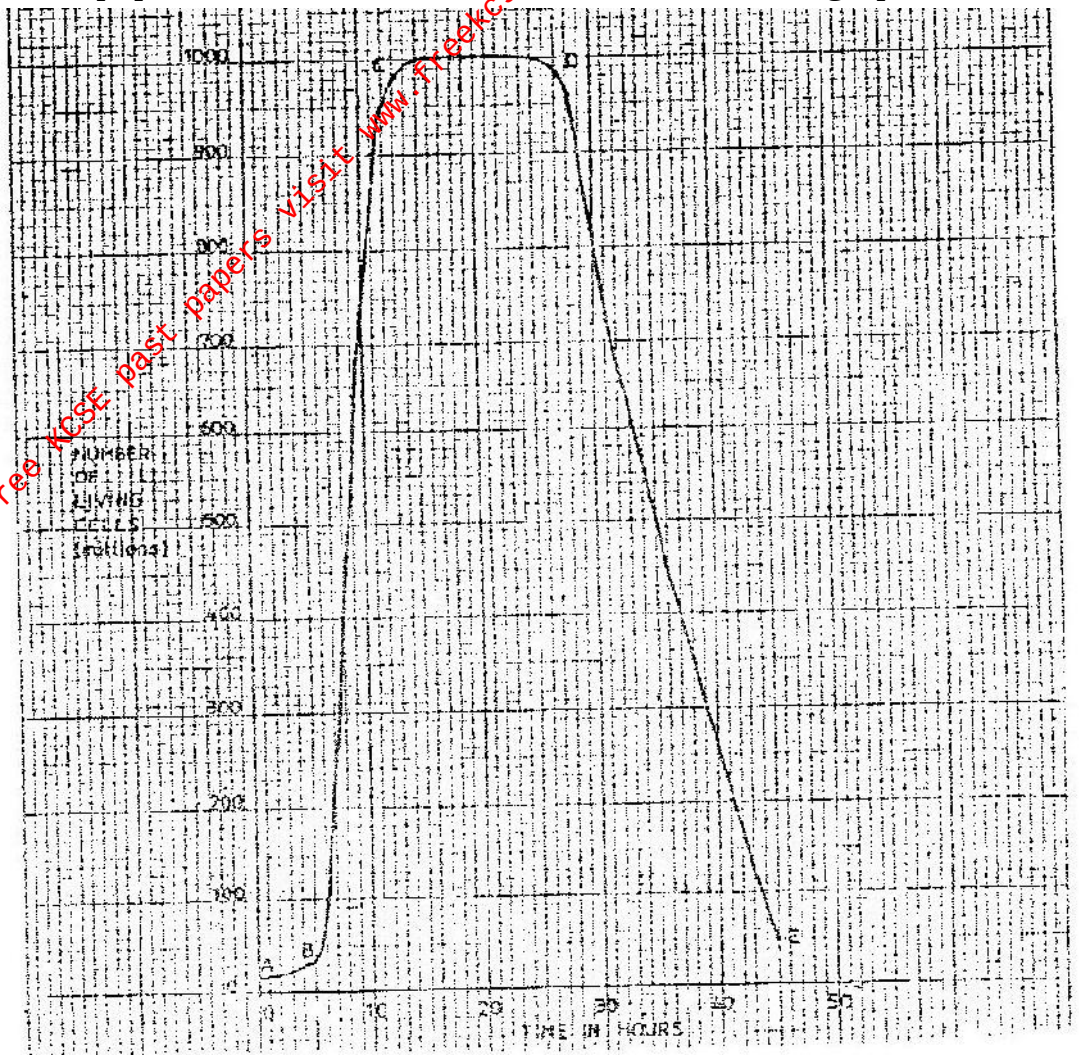
18. In an experiment black mice were crossed and the offspring were back and brown. The gene for black colour is dominant over that of brown colour. Using letter B to represent the gene for black colour and b to represent the gene for brown colour
(a) Work out the genotypes of the F_1 generation (4 mks)
(b) What is the phenotype ration of the spring (1 mk)

19. The diagram below represents then pathways of water from the soil into the plant.



(a) Name the structures labeled K and L. (2 mks)
(b) Explain how water from the soil reaches the structure labeled L. (5 mks)
(c) Name the process by which mineral salts enter into the plant (1 mk)

20. A culture of bacteria was incubated in nutrient agar at 35^0C. Samples were taken at intervals in order to estimate the number of bacteria in the population. The data obtained is shown in the graph below.



(a) When was the pollution of bacteria 350 million

(b) Account for the shape of the graph between
(i) A and B
(ii) B and C
(iii) C and D

(c) Give three reasons for the shape of the curve between D and E

(d) (i) Suggest what would happen to the population of the bacteria if the temperature was lowered to 0^0 after incubating for 12 hours.
(ii) Give a reason for your answer in (d) (i) above

(e) Give three reasons why it is important to control human population growth rate in Kenya?

21. Explain how the mammalian skin is adapted to perform its functions (20 mks)

22. Describe how new plants arise by asexual reproduction (20 mks)